XJ/BBAFFI

In Med Micro Course Notes 1945
First reference to sex in bacteria
7/10/1945

[9-12-72 Note juxtaposition of yeast life cycle dissociation
Kohn & Harris]

Bacteria are 7/9 [1945]

microsc. plant-like microorganisms /s chlorophyll
repr. by binary fission

Morphological differences - Microscopic developments

cocci	light
rods	electron
spirilla	dark field

Size variation considerable
Neither chitin nor cellulose
Nucleus - debatable
Some species show granules - volutin
metachromatic
polar etc.

Some species show capsules. Usually assoc. with high virulence are immune-specific. SSS.

Motility - flagella found on some rods and spirilla

Spores - some rods. A resting stage

Sex? Gram stain mechanism
1. physical - cortical region sp.
2. Phys Chem. Strains & Strains IEP [ISO electric point]
3. Chemical - spec Denszen

Colonies - descendants of single cells
two types S, R
Pleimorphism - Lohnis -
Mellon -

Variation in Bacteria
Hadley. Micr. Dissociation
a. life cycle - incl filtrable phase
Clinically important - S. e.g. being pathogen virulent
Ex. anthrax

R-S transition Reversibility
L. acidophilus (R)
On cultivation, S may be obtained. Inreversible.

Transmutation, ex. Pneumococci
cit Avery et al, Dawson, etc.

Bacteria - chemistry 9/10 Eschericia coli

1. water
2. ash 2-13% K=13% Na=2% Cl=0
3. proteins 8-15% Arginine, Hist, lysine, tyrosine

Nucleoproteins enzyme proteins (apoenzymes)
4. carbohydrate - cellulose?
SSS
ribose in complexes

Growth cycle lag, log, late phases

(glucose? distinctive) basis - space??
autotrophs + heterotrophs -

final bacterium may contain more G.F. than is provided by medium; implies "adaptation" regularly
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extracellular reactions - hydrolyses

intracellular.....

Life cycle of yeasts

Saccharomyces [diagram]
diplophase haplophase diplophase
ascospores

Parthenogenetic formation of ascospores claimed by Guilliermond.

No essential differentiation
Single ascospores isolations can yield normally sporulating cultures.

Winge - vs Lindegren on regularity of illeg. diploids (single ascospores cultures) and fertility of their ascospores.
germination parthenogenesis

In Schizosaccharomyces, as in molds.

[diagram]

Mating types?
Size of ascospores?

Smut fungi
[diagram]

Variation
"type" forms
Isolated observations contemp with Koch. Koch maintained a strictly monomorphic
- hypothetical autogany: polycarya
[diagram]

Only reasonable classificaiton is etiologic. Of recognized causes of death

Exogenous - animate 42.7%
inanimate 22.3%

Endogenous - unknown 38%
(idiopathic!)

Mechanisms of disease: Infection df. process by which (parasitic) organisms gain entrance to a susceptible host, causing injury and giving rise to a reaction.

Saprophytes vs parasite

a. Thermophiles - capable of growth at 37 as in T.B.

Pathogenicity is "adaptation". Many lose "virulence" on artificial culture. Response mechanism? e.g. B. pestis. Some maintain virulence B. typhosus

b. Host specificity

c. Growth rate - increase in virulence as serial transfer during log phase

Aggression + organism --> virulent organism?

Wash organism

Dosage - variability

General host reactions.
1. Incubation period - apparent even with toxin
2. Fever
3.

Mechanisms of resistance

Nutritional variation in E coli [Kohn & Harris]

1. Test strain - inoculate a type strain into Basal medium
   carry through 5 transfers

2. Isolate - Plate out from minimal. Select a small colony, on to basal-agar.
   cultivate in Basal

3. Repeat isolation, select a colony, prepare agar slant for storage
   inoculate into basal. = T 0

4. Serial transfer through SA and dl-methionine, A,B,C,D,E - varying
   proportions. Transfer every 48 hours, from lowest tube showing
   visible turbidity to = +higher tubes, and to basal (X).
   When inocula do not grow in basal medium, variation has been achieved.
   Concurrently, transfer serially through methionine alone (M).

5. After inoculation from a culture, store in icebox. After variation is
   established, plate out previous transfers to test their homogenicity.

6. Test variant for methionine requirement
   " for adaptation
   " for quantitative response to methionine
   " for specificity of response

Regeneration of Tissues

a. skin. Edges of intact epidermis elaborate outgrowths on and surface of fibrin, 1-2 cells thick, later thickening, later some papillation. Sw. glands; hair follicles not formed. incomplete. Corium C. T. irregular and densely bound s/adipose.

b. Sk Muscle - At cut end of fibre, cytoplasm exudes; nuclei accumulate in bud. Bud grows, nuclei proliferate (compare with embryonal muscle cell). Nuclei wander peripherally striae develop.... However, fibroblasts envelop the bud with collagen.

c. Card. Muscle - very slight ability for regeneration.

d. Nerve. Glia - very proliferative. Neurons do not multiply. Functional substitution. "Associated with structural complexity of cell" Cell cannot withdraw its processes. Outgrowth of nerve processes. May be blocked (neuroma) by collagen.

e. Kidney - If tubule is destroyed, no reformation. Glomeruli are not neo-formed. If a fw cells are destroyed, rest of tubule can grow __?___ - flat, low cuboidal cells....

f. Liver - Wax plate reconstructions may indicate some budding off of new lobules - (where published?)
Central necrosis - replacement very rapid from periphery. "New cells more resistant to Ccl4" ascribed to "anaplasia" fat content?

Intestine - as skin, folds form, pits form, villi redevelop. Complete regeneration. down to muscularis; muscularis externa does not regenerate.

Bone:

Problem:

1. Staph transformation, independence of a) pigment [*]
   b) antigenic formula (ABC?)

2. Growth vs differentiation - Growth "energy"

3. Is differentiation the acquirement of new forms or the loss of most of the genetic repertoire with the exaggeration of some part. Is not the "primitive" cell a composite of all structures and functions of mature, "differentiated" cells.

4. Sex in bacteria: If stable mutants are available, for two deficiencies, incubate together in a) minimal b) partial c)complete inocula.

Plate out old cultures on minimal agar. Compare frequency of survivors with that of individual old cultures. (Compare Sherman & Wing) Test for transformation by broth filtrates or killed. Because of selectivity, this is a preferable method, if stability can be achieved.

[One can also perform the comparable test of antigen inheritance, particularly with independent alleles]

If the frequency of recovery of ++ is significantly greater than

[* must be Burnet & McKie 1929; Byatt is 1948; 4/17/73]